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DU MONT

EXTENDED-RANGE OSCILLATOR
TYPE 347

AND MATCHING TRANSFORMER
TYPE 2624

347

Allen B. Du Mont Laboratories, Inc.

TECHNICAL PRODUCTS DIVISION

760 BLOOMFIELD AVENUE, CLIFTON, N. J., U. S. A.

DU MONT

EXTENDED-RANGE OSCILLATOR

TYPE 347

AND MATCHING TRANSFORMER TYPE 2624

Operating and Maintenance Manual

Allen B. Du Mont Laboratories, Inc.

TECHNICAL PRODUCTS DIVISION

760 BLOOMFIELD AVENUE, CLIFTON, N. J., U. S. A.

Part No. 67026341

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FIGURE 1. TYPE 347 EXTENDED-RANGE OSCILLATOR

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SPECIFICATIONS

1. PHYSICAL

TYPE 347 EXTENDED-RANGE OSCILLATOR

Total Weight — 6 pounds
Cabinet Height — 6¼ inches
Cabinet Width — 4¼ inches
Cabinet Depth — 5¼ inches

TYPE 2624 MATCHING TRANSFORMER

Total Weight — 1½ pounds
Cabinet Height — 2 inches
Cabinet Width — 4¼ inches
Cabinet Depth — 5¼ inches

2. ELECTRICAL

TYPE 347 EXTENDED-RANGE OSCILLATOR

A. Frequency Ranges
18 cps to 1.1 mcps in five overlapping ranges:

18 to	210 cps	— ×1
180 to	2100 cps	— ×10
1800 to	21,000 cps	— ×100
18,000 to	210,000 cps	— ×1Kc
0.18 to	1.1 mcps	— ×1Mc

B. Calibration Accuracy
18 to 210,000 cps ranges: ±(2% + 1 cycle)
0.18 to 1.1 mcps range: ±10%

C. Output Level
10 volts rms ±10% at 1000 cps into an open circuit.
Maximum current, 4 ma rms.
+ 15 db into 2000-ohm load.

D. Output Source Impedance
AC: 400 ohms in series with 20 μf for outputs of less than 4 ma.
DC: 56,000 ohms.

E. Distortion

Output Level	At 30 cps	100 to 20,000 cps
2 volts (10K ohm Load)	Less than 0.4%	Less than 0.2%
10 volts (10K-ohm Load)	Less than 0.8%	Less than 0.4%
2 ma Load Current	Less than 1%	Less than 1%
4 ma Load Current	Less than 2%	Less than 2%

F. Frequency Stability
Line voltage change 105 to 130 volts:
±0.3% from 18 to 100,000 cps
Ambient temperature change 0 to +50° C
±0.5% from 18 to 100,000 cps

G. Output Level Stability (any Amplitude control setting)
18 to 210,000 cps: ±0.5 db
0.18 to 1.1 mcps: ±2 db

H. Hum and Noise Level
3 mv or 60 db below signal level whichever is greater over most of the frequency range

I. Input Power Required
117 volts ±10%, 50 to 400 cps, 40 watts

TYPE 2624 MATCHING TRANSFORMER

A. Frequency Response
±0.5 db from 20 to 50,000 cps

B. Output Level
+8 dbm maximum for the 150- and 600-ohm output

C. Output Impedance
Balanced 150 or 600 ohms ±5% from 20 to 50,000 cps

DESCRIPTION

1.0 DESCRIPTION

The Du Mont Type 347 Extended-range Oscillator is designed to provide a sine-wave output in the frequency range of 18 cycles to 1.1 megacycles divided into five overlapping ranges. Intended for general use as a stable, precision source of low distortion signals in the audio and ultrasonic frequency ranges, the Type 347 is a small convenient unit, light in weight, equally suitable for laboratory and production applications or for field testing and maintenance purposes.

Normally intended for operation into a high impedance load, the Type 347 can be connected to the Type 2624 Matching Transformer to convert the output to 150 or 600 ohms, balanced or unbalanced.

The Type 347 Oscillator is contained in a small portable rectangular case with a leather strap handle. The Type 2624 Transformer is housed in a matching case with its input terminals so located that the Oscillator can be fastened on top and connected by suitable metal links.

The Type 347 Extended-range Oscillator circuit consists of a Wien-bridge type resistance-capacitance tuned oscillator, with a feedback network and a thermal negative-resistance element to maintain operating stability over the entire frequency range. A cathode-follower output stage isolates the oscillator section from the load.

Output frequency is controlled by the large calibrated dial and the associated RANGE switch located on the front panel. The large dial is calibrated in two scale sections, the outer for the four lower ranges, the inner for the highest range only. The AMPLITUDE control is logarithmic-

ally tapered to provide a relatively linear adjustment of output level over its entire scale. The control is calibrated at 1000 cps to supply an open-circuit output voltage of 10 volts ±10% in the full clockwise position. The full counter-clockwise position of the AMPLITUDE control actuates a switch to turn the Type 347 on and off. The AMPLITUDE control is intended to provide an approximate indication of output level only; for accuracy, use an external vacuum-tube voltmeter connected to the output terminals.

The Type 2624 Matching Transformer consists of the transformer itself and terminals with removable straps to set the output to the desired impedance.

The power supply section of the Oscillator consists of a full-wave rectifier circuit operating into a single-section capacitor input smoothing filter.

OPERATION

2.0 OPERATION

2.01 General

Connect the power cord to a source of 117 volts ac. Turning the AMPLITUDE control from its full counter-clockwise position will place the Type 347 Oscillator on. The pilot lamp will provide the power-on indication.

In operation, the dc potential difference between the output terminals of the Oscillator is negligible. The ground terminal is connected to the power supply negative through a 20-μf capacitor, while the signal output terminal is connected to the cathode of the cathode-follower stage. For lowest distortion, avoid connecting the output across a dc potential of more than a few volts. A potential greater than 50 volts may damage the 20-μf capacitor mentioned above. Use an external blocking capacitor when applying the Oscillator signal into a load with a higher voltage.

2.02 High Impedance Unbalanced Output

Connect to the output terminals located on the front panel of the unit.

Select the frequency desired by means of the large dial and the RANGE switch.

Use the AMPLITUDE control to vary the output level. The cathode-follower output stage has a source impedance of approximately 400 ohms, and is capable of a maximum current of 4 ma rms at a maximum distortion of 1%. The output voltage obtained therefore, will depend upon the load impedance. At 1000 ohms, the unit will deliver 4 volts rms, with a linear increase of voltage with increasing impedance up to a maximum of 10 volts.

At lower output levels, the distortion is considerably less; for example, at 2 volts across 2000 ohms, the distortion is less than 0.3%.

All of the above impedances are assumed to be largely resistive; reactive loads may cause reduction of output voltage.

Due to the lack of reference markings on the AMPLITUDE control, the use of an external attenuator is recommended to obtain outputs of less than 0.1 volt.

2.03 Balanced or Unbalanced Output at 150 or 600 ohms

The Type 2624 Matching Transformer is used to convert the high impedance output of the Oscillator to 150 or 600 ohms, balanced or unbalanced. It is also useful when no dc at the output can be tolerated.

The case of the Type 2624 Transformer is designed to be located under the Type 347 Oscillator. In this position, two straps connect the output of the Oscillator to the input of the Transformer.

To fasten the two unit cases together:

1. Remove the case from the Type 2624 Matching Transformer by removing the four screws in the bottom and the two on the front of the case.
2. Remove the four rubber feet from the bottom of the Type 347 Oscillator.
3. Attach the four rubber feet removed in 2, to the bottom of the Transformer bottom plate. Use the holes located towards the center of the plate.
4. Attach the Transformer case removed in 1, to the bottom of the Type 347 Oscillator using the self-tapping screws provided. Use the holes that previously held the rubber feet in the Oscillator through the mating holes in the cutout top of the Transformer case.
5. Replace the Type 2624 Matching Transformer bottom mounting plate and panel in the Transformer case now fastened to the Oscillator. Replace the four screws in the bottom and the two in the panel to secure the bottom plate and panel to the case.

For the electrical connections required to the Type 347 Oscillator, locate the straps between the Oscillator output and the Transformer input immediately below.

Select the output impedance desired by means of the straps at the output terminals. Follow the markings on the panel or the drawing on the schematic diagram of Figure 3. Note that the output terminals are not grounded so that a balanced output may be obtained. For an unbalanced or grounded output, connect one of the output posts to the ground terminal of the Type 347 Oscillator. This terminal is identified on the panel by the ground circuit symbol.

When using the Matching Transformer, note that the frequency response of the Type 2624 is within ±0.5 db from 20 to 50,000 cps.

3.0 MAINTENANCE

3.01 General

As the Type 347 Extended-range Oscillator is a precision calibrated instrument, it is *not* recommended that any maintenance beyond tube replacement or similar routine servicing be attempted. If the unit does not perform satisfactorily, return the instrument to the Factory Service Department for repair and adjustment.

> CAUTION: THE PERFORMANCE OF THE UNIT IS AFFECTED BY THE POSITION OF SOME OF THE WIRING. DO NOT DISTURB ANY OF THE WIRING OR THE POSITION OF ANY COMPONENT.

The chassis of the Type 347 may be removed from its case by extracting the two screws located towards the left rear of the back of the cover.

It should be noted that in an atmosphere of high humidity, erratic behavior may be noticed on the lowest ranges. This will usually clear up after the unit has been operated for a while and the moisture has evaporated.

If the erratic behavior persists after the unit has been allowed to heat for a time, the tuning capacitor mounting board should be cleaned to remove conductive dust particles. Be careful not to change the adjustment of the trimmer capacitors near the tuning components.

3.02 Tube and Stabilizing Lamp Replacement

After replacement, check the Oscillator distortion on a distortion meter, selecting tubes or lamps causing the least distortion. Check the hum adjustment as described in Section 3.03 to follow.

High distortion on all ranges and levels is usually due to either the stabilizing lamp or to the oscillator 6AK6 (V2).

Distortion only at high output levels is usually due to grid current in the 6SJ7 (V1).

3.03 Hum Adjustment

Heater-induced hum is minimized by the adjustment of the potentiometer, R27, connected across the filament circuit. When a tube is replaced, the setting of this control should be checked.

To do so, set the AMPLITUDE control to a convenient level (3 to 10 volts) with the frequency at about 60 cps.

Connect a vacuum-tube voltmeter such as the Du Mont Type 346 or its equivalent. With the unit in its case, adjust the hum control for minimum meter beat. The hum control is reached through an access hole in the left side of the case as viewed from the front. See Figure 2.

Further hum reduction can sometimes be achieved by experimenting with ac power-plug reversal of the Type 347 and the equipment involved.

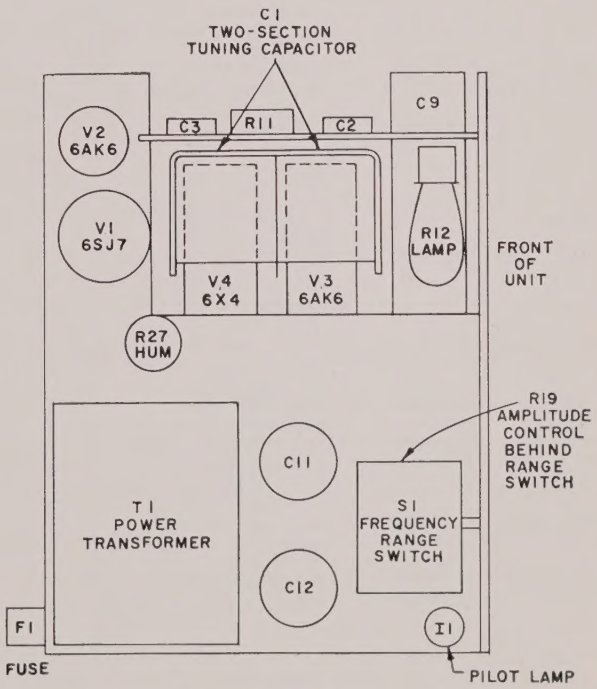


FIGURE 2. LEFT SIDE VIEW TYPE 347 EXTENDED-RANGE OSCILLATOR

PARTS LIST

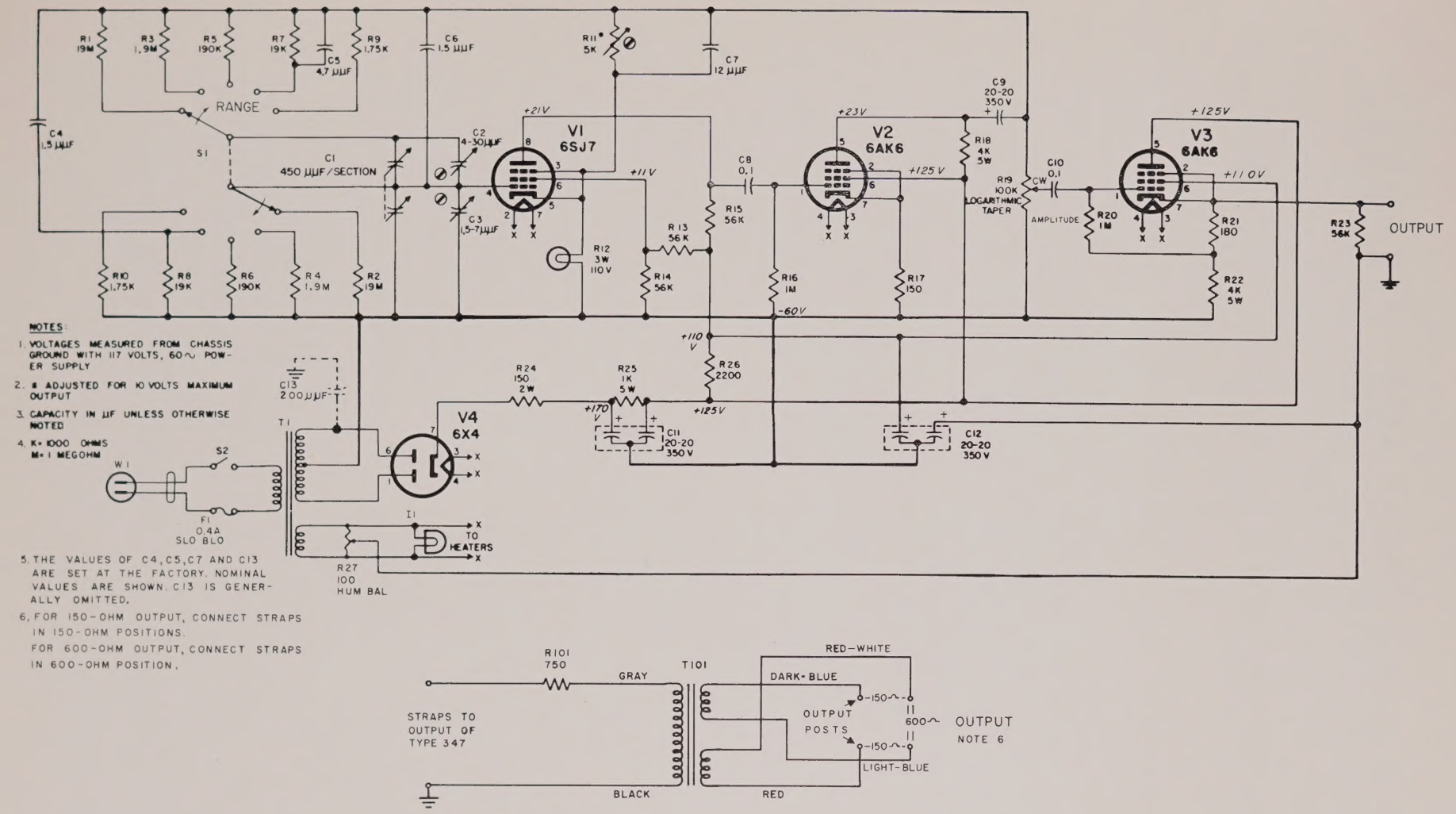
4.0 ELECTRICAL PARTS LISTS

4.01 Type 347 Extended-range Oscillator

Symbol	Du Mont Part Number	Description
		CAPACITORS
		(Fixed, ceramic, 500 V unless otherwise specified)
C1	03127450	Variable, Air, 2 Section, 450 × 450 μμf
C2	03003070	Variable, 4-30 μμf
C3	03106870	Variable, 1.5-7 μμf
C4	03167290	1.5 μμf, ±0.25 μμf, Temp. Comp.
C5	03167600	4.7 μμf, ±0.5 μμf, Temp. Comp.
C6	03167290	1.5 μμf, ±0.25 μμf, Temp. Comp.
C7	03167350	12 μμf, ±5%, Temp. Comp.
C8	03165840	Paper, 0.1 μf, ±20%, 200 V
C9	03169670	Electrolytic, 2 Section, 20 × 20 μf, 350 V
C10	03165840	Paper, 0.1 μf, ±20%, 200 V
C11 & C12	03169670	Electrolytic, 2 Section, 20 × 20 μf, 350 V
C13	03156580	200 μμf
		FUSE
F1	11000920	0.4 Amperes, Slow Blow
		LAMP
I1	12001370	Incandescent, 0.25 Ampere
		RESISTORS
		(Fixed, composition, ±10%, ½ W, unless otherwise specified)
R1 & R2	02240200	Film, 19M ohms, ±1%, 1 W
R3 & R4	02244260	Film, 1.9M ohms, ±1%
R5 & R6	02243990	Film, 190K ohms, ±1%
R7 & R8	02243680	Film, 19K ohms, ±1%
R9 & R10	02236780	Film, 1750 ohms, ±1%
R11	01070290	Variable, Wire Wound, 5K ohms, 2 W
R12	12002500	Stabilizing Lamp, Incandescent, 0.25 Ampere
R13 to R15	02031980	56 ohms
R16	02032130	1M ohms
R17	02031670	150 ohms
R18	02110910	Wire Wound, 4K ohms, ±5%, 5 W
R19	01070140	Variable, 100K ohms, ¾ W
R20	02032130	1M ohms
R21	02031680	180 ohms
R22	01110910	Wire Wound, 4K ohms, ±5%, 5 W
R23	02031980	56 ohms
R24	02037670	150 ohms, 2 W
R25	02110820	Wire Wound, 1K ohms, ±5%, 5 W
R26	02031810	2200 ohms
R27	01070210	Variable, Wire Wound, 100 ohms, 2 W
		SWITCHES
S1	05011061	Rotary, Range
S2		Part of R19
		TRANSFORMER
T1	20010411	Power
		TUBES
V1	25000270	6SJ7
V2 & V3	25000350	6AK6
V4	25000170	6X4
		CABLE
W1	50135710	AC Power Line Cord

4.02 Type 2624 Matching Transformer

Symbol	Du Mont Part Number	Description
		RESISTOR
R101	02030450	Fixed, Composition, 750 ohms, ±5%, ½ W
		TRANSFORMER
T101	20009951	Output
		MISCELLANEOUS
—	51017770	Jumper Straps



NOTES:

1. VOLTAGES MEASURED FROM CHASSIS GROUND WITH 117 VOLTS, 60~ POWER SUPPLY
2. R ADJUSTED FOR 10 VOLTS MAXIMUM OUTPUT
3. CAPACITY IN µF UNLESS OTHERWISE NOTED
4. K = 1000 OHMS
   M = 1 MEGOHM
5. THE VALUES OF C4, C5, C7 AND C13 ARE SET AT THE FACTORY. NOMINAL VALUES ARE SHOWN. C13 IS GENERALLY OMITTED.
6. FOR 150-OHM OUTPUT, CONNECT STRAPS IN 150-OHM POSITIONS.
   FOR 600-OHM OUTPUT, CONNECT STRAPS IN 600-OHM POSITION.

2624 MATCHING TRANSFORMER

SCHEMATIC OF CIRCUITS
DU MONT TYPE 347 EXTENDED-RANGE OSCILLATOR AND TYPE 2624 MATCHING TRANSFORMER

Reference Drawing No. 98001141-4, Issue 2

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WARRANTY AND SERVICE NOTICE
for
Industrial Type Cathode-ray Tubes and Instruments

DU MONT INSTRUMENTS

Each instrument manufactured by the Technical Products Division of Allen B. Du Mont Laboratories, Inc., is guaranteed to equal or exceed its published performance specifications. It is further guaranteed against defective materials (other than the cathode-ray tube) and workmanship for a period of one year from delivery date. Any defective instrument or an instrument that does not meet or exceed our specifications will, upon inspection by us, be repaired or replaced at our discretion should such defect appear within the guarantee period.

To register this guarantee, the enclosed guarantee card must be properly filled out and mailed to the factory immediately upon receipt of the equipment. Complete information is necessary. BOTH THE TYPE NUMBER AND THE SERIAL NUMBER OF THE INSTRUMENT MUST BE GIVEN ON THIS CARD.

Instruments must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

DU MONT CATHODE-RAY TUBES

Industrial type cathode-ray tubes manufactured by Allen B. Du Mont Laboratories, Inc., are guaranteed for 1000 hours of operation or for a six-month period from date of shipment, whichever expires first. Adjustments will be made on the merit of each individual claim because of the widely varying applications to which such tubes are subjected, and a tube which becomes defective during the guarantee period will be replaced ONLY AFTER INSPECTION AT THE FACTORY. Cathode-ray tubes returned under the guarantee, must be shipped with transportation paid.

BURNED-OUT HEATERS AND BROKEN GLASS ARE NOT COVERED BY THE TUBE GUARANTEE

To register a tube guarantee, the guarantee card enclosed with the tube must be filled out properly and mailed to the factory immediately upon receipt of the equipment. Complete information is necessary. TYPE NUMBER AND SERIAL NUMBER OF THE CATHODE-RAY TUBE MUST BE INCLUDED. The serial number of the tube will be found either on the glass stem of the electron-gun structure or on the bulb near the Du Mont brand. Tubes must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

CHANGES IN SPECIFICATIONS

The right is reserved to change the published specifications of equipment at any time and to furnish merchandise in accordance with current specifications without incurring any liability to modify equipment previously sold, or to supply new equipment in accordance with earlier specifications excepting under the classification of special apparatus.

SERVICE

In order to insure factory service under our guarantees, the guarantee cards enclosed with all instruments and tubes must be properly filled out and returned. In all cases where service or adjustment is requested, please write first to the factory giving complete information concerning the nature of the failure and describing the manner in which the equipment was used when failure occurred. THE TYPE NUMBER AND SERIAL NUMBER of the equipment must also be given. In this way, much time can be saved and unnecessary inconvenience often avoided. When writing in this respect, address:

Allen B. Du Mont Laboratories, Inc.
Technical Products Division
760 Bloomfield Avenue, Clifton, New Jersey

The Technical Products Division will then send to the customer, the written procedure for sending the instrument back to the factory. All equipment should be packed and shipped in accordance with this procedure; and identification tags should be attached to each tube or instrument.

REPLACEMENT PARTS

If it is necessary to order a replacement component from the factory, always give the type number and serial number of the instrument and refer to the component by its symbol designation and description on the circuit schematic. This will help to expedite service.

DUMONT

Additional copies of this manual may be secured at a cost of fifty cents each or five dollars per dozen copies; postpaid in the United States of America only.

Allen B. DuMont Laboratories, Inc.

TECHNICAL PRODUCTS DIVISION

760 BLOOMFIELD AVENUE, CLIFTON, NEW JERSEY